S/181/61/003/003/025/030
B102/B205

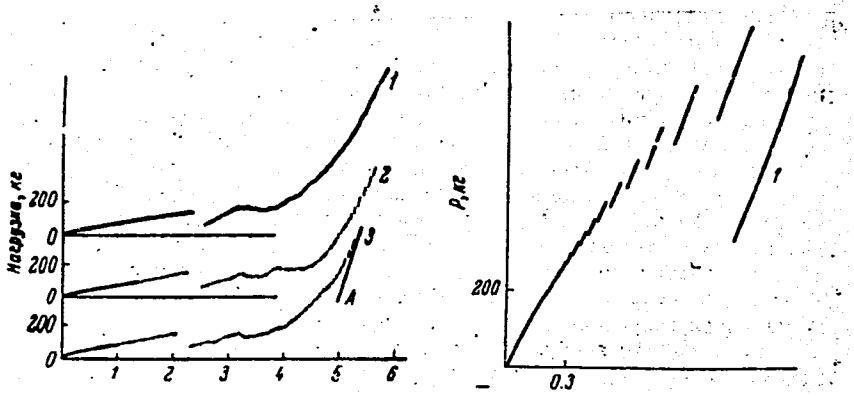
Discontinuous character ...

1 table, and 18 references: 16 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATION:-- Fiziko-tekhnicheskiy institut AN USSR Khar'kov (Institute of Physics and Technology, AS UkrSSR, Khar'kov)

SUBMITTED: August 10, 1960

Figs. 2 and 3



Card 4/8

S/126/61/011/001/005/019
E111/E452

AUTHORS: Gindin, I.A., Lazarev, B.G. and Starodubov, Ya.D.

TITLE: Low-Temperature Metallography of Lithium

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.1, pp.46-51

TEXT: The authors point out that no information is yet available on microstructural changes during martensitic transformation of alkali metals in cooling to low-temperatures and heating or after "deformational" polymorphic transformation; or on the mutual effect of transformations on microstructure. In their present investigation, which is a continuation of their work in this field, the authors have studied by low-temperature metallography the microstructure of lithium and its changes in the polymorphic-transformation temperature region. Polished sections were prepared as previously described (Ref.1). For preliminary low temperature investigations, previously prepared lithium specimens (Ref.1) were used; these had been stored in liquid nitrogen and photomicrographs corresponding to this temperature could then be obtained directly. For other temperatures, a special cryostatic apparatus was constructed in which the required specimen temperature

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S/126/61/011/001/005/019
E111/E452

Low-Temperature Metallography of Lithium

was obtained by suitable selection of thermal resistance between it and a massive copper heat conductor whose other end was immersed in cooling liquid. The temperature of the 7 x 7 x 2 mm specimen, which could be microscopically observed, was measured with a copper-constantan thermocouple or, for below 20°K, with an indium resistance thermometer. The whole was inside a vacuum jacket connected to a separate pump and containing activated charcoal. The optical system was part of a type ПМТ-3 (PMT-3) apparatus with a photographic attachment. Microphotos show the original room temperature microstructure and also needles of the hexagonal modification and a chain of martensitic needles with a grain-boundary fracture. The extent of martensitic transformations does not exceed 25 to 30% and volume changes produce shear deformation. A further figure shows the changes from the original microstructure at a given point on the section during repeated cooling and warming. Preliminary plastic deformation at 78°K was found to impede formation of the hexagonal modification on subsequent cooling below the martensitic point:. on the microstructure, wavy slip lines are visible which represent regions of localized face-centred cubic

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S/126/61/011/001/005/019
E111/E452

Low-Temperature Metallography of Lithium

structure. This effect is similar to that in body-centred cubic metals (Ref.11). The work provides some confirmation for the authors' previous conclusions (Ref.1) on the behaviour of lithium. The low-temperature improvement of the mechanical properties of this metal is attributable to the fine dispersion of the two-phase structure produced through "deformational" polymorphous change. There are 6 figures and 11 references: 8 Soviet and 3 non-Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR
(Physicotechnical Institute AS UkrSSR)

SUBMITTED: June 28, 1960

Card 3/3

22966

18.8200

S/126/61/011/005/014/015
E193/E183

AUTHORS: Gindin, I.A., Starodubov, Ya.D., and Vasyutinskiy, B.M.

TITLE: Plasticity and brittleness of cast molybdenum at temperatures between 4.2 and 700 °K. I.

PERIODICAL: Fizika metallov i metallovedeniye, Vol.11, No.5, 1961, pp. 794-800

TEXT: The object of the present investigation was to explore the possibilities of low-temperature application of refractory metals such as Mo, Cr, W, Nb, etc. To this end, the mechanical properties of Mo were determined by means of the standard tensile test at 4.2-700 °K, and the effect of preliminary heat- and mechanical treatment on the transition temperature from the ductile to brittle fracture was studied. Mo of 99.95% purity was used in the experiments, the main impurities consisting of (%): 0.005 Fe; 0.01 Ni; 0.017 Ca; 0.002 Al; 0.002? O; 0.0009 N; 0.0006 H. To ensure uniform grain size, the ingots cast in vacuum-arc furnace were hot-rolled at 1000 °C to 50% reduction in thickness, spark-machining having been used for the preparation of flat, tensile test pieces of 7 mm gauge length and 2 mm^2 cross-section.

Card 1/

After machining the test pieces were vacuum-annealed at 1280 °C. This treatment reduced the gaseous impurity content and produced a coarsely-crystalline structure with the average grain size of 200-400 μ. The tensile tests were carried out at 4.2, 20, 77, 183, 200, 223, 243, 300, 435 and 700 °K, at two rates of strain, 0.4 and 30 μ/sec. Some of the results obtained at the rate of strain of 0.4 μ/sec are reproduced in Fig.3, where the yield point (σ_s), U.T.S. (σ_b) and the true tensile strength (σ_u) measured in kg/mm^2 are plotted against the test temperature (°K). It will be seen that all these properties increase with decreasing temperature. The point of intersection of the σ_s and σ_b curves determined the transition temperature from ductile to brittle fracture, which in this case was 183 °K. The unusual feature of curves shown in Fig.3 is that they all pass through a maximum at approximately 80 °K, since it is generally believed that the tensile strength in the brittle fractural region does not depend on temperature. With increasing rate of strain, both σ_s and σ_b increased, and the temperature of the transition from ductile to brittle fracture was shifted to 208 °K. The plastic properties of Mo have been found to decrease with decreasing temperature at a rate which increases with

increasing rate of strain. This is illustrated in Fig.5, where elongation (δ, %) and reduction of area (ψ, %) are plotted against the test temperature (°K) for specimens extended at 0.4 (open circles and squares) and 30 μ/sec (black circles and triangles). In the second stage of the present investigation, the tensile test pieces were subjected to the following treatment: (1) loading at room temperature and at a rate of strain of 0.4 μ/sec to attain a stress equal to 0.5 σ_s; (2) slow cooling under constant load to 77.2 °K and holding at that temperature for 1-1.5 hours. It was found that after this preliminary treatment, the test pieces tested at 183 °K (i.e. at the critical temperature) exhibited some degree of ductility (δ 5%). Fig.6 shows the actual load (kg) versus strain (μ) curves for Mo tested at 183 °K at a rate of strain of 0.4 μ/sec for untreated (curve 1) and treated (curve 2) specimens. In Fig.7 the elongation (δ, %) of untreated (curve 1) and treated (curve 2) test pieces is plotted against the test temperature. It was found also that no significant improvement in ductility can be achieved by cooling the metal (during the treatment described above) to temperatures lower than 77 °K. An increase in

the low-temperature ductility of iron, subjected to similar treatment, has been attributed (Ref.1: Gindin, I.A., FMM, 1960, 9, 447) to the formation of twins with dislocation-free boundaries. In the case of molybdenum, the present authors postulate, the increased ductility attained by this treatment is associated mainly with the stress-dependence of the temperature coefficient of linear expansion and with the changes in the mosaic structure of the metal subjected to stresses at low temperatures.
There are 8 figures and 8 references: 6 Soviet and 2 non-Soviet.
The English language reference reads as follows:
Ref.6: J.H. Bechtold, J. Metals, 1953, 5, 1469.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR
(Physico-technical Institute, AS Ukr.SSR)

SUBMITTED: August 15, 1960

GINDIN, I.A.; STARODUBOV, Ya.D.; VASYUTINSKIY, B.M.

Metallographic investigation of molybdenum deformed by stretching at temperatures of 4.2-700°K. Part 2. Fiz. met. i metalloved 12 no.1:132-139 Jl '61. (MIRA 14:8)

1. Fiziko-tekhnicheskiy institut AN USSR.
(Molybdenum--Metallography) (Metals at low temperatures)

S/126/61/012/006/007/023
E193/E383

AUTHORS: Gindin, I.A., Lazarev, B.G., Starodubov, Ya.D. and Lazareva, M.B.

TITLE: Mechanical properties of sodium in the range of low-temperature polymorphic transformations

PERIODICAL: Fizika metallov i metallovedeniye, v. 12, no. 6, 1961, 846 - 852

TEXT: As is the case with Li, the body-centred cubic crystal structure of Na undergoes a partial change to close-packed hexagonal on cooling below 35 °K. A so-called "deformation" modification of this metal can be obtained by straining it plastically at temperatures below 80 °K and the object of the present investigation was to check whether the effect of low-temperature polymorphism of Na on its mechanical properties is similar to that observed earlier by the authors (Ref. 1: FMM, 1960, 10, 472) in Li. To this end, tensile tests were carried out at 1.6 - 290 °K on polished and etched test pieces of 99.8% pure Na and the following properties were

Mechanical properties of ....

determined: 0.2% proof stress; UTS; true tensile strength; elongation; reduction in area and the strain-hardening coefficient. In addition, the microhardness of each fractured specimen was measured at 77 °K, side-by-side with that of a pilot (i.e. untested) specimen. Typical results are reproduced graphically. In Fig. 2, the elongation (δ, % - lefthand scale) and reduction in area (ψ, % - righthand scale) are plotted against the test temperature (°K). The temperature-dependence of 0.2% proof stress ($\sigma_{0.2}$), UTS (σ_b) and true tensile strength (σ_u) is reproduced in Fig. 3. Finally, in Fig. 4 the microhardness (H, kg/mm^2) measured at 77 °K is plotted against the temperature (°K) to which the test piece had been cooled prior to hardness test; the lower curve relates to pilot specimens, the upper curve representing results obtained near the neck of fractured tensile-test pieces. Several conclusions were reached.

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S/126/61/012/006/007/023
E193/E383

Mechanical properties of ....

1) Anomalous variation of mechanical properties of Na in the sub-zero temperature range is associated with polymorphic transformations taking place at these temperatures.
2) The martensitic transformation which on cooling takes place in Na at about 35 °K is reflected in a sharp increase in its yield strength, UTS and microhardness.
3) A minimum in the elongation versus temperature curve is situated in the temperature range within which the deformation-induced polymorphic transformation takes place. The rapid increase in elongation on cooling from 70 to 1.6 °K can be attributed to the deformation-induced change from body-centred cubic to close-packed hexagonal crystal structure.
4) The low-temperature polymorphic transformations (particularly the martensitic transformation) bring about an increase in the degree of strain-hardening and uniformity of the plastic flow of Na. There are 4 figures, 1 table and 12 references: 6 Soviet-bloc and 6 non-Soviet-bloc. The four latest English-language references mentioned are:

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S/126/61/012/006/007/023
E193/E383

Mechanical properties of ....

Ref. 2: C.S. Barrett - Phys.Rev., 1947, 72, 245; Acta crystallog., 1956, 9, 671; Ref. 8: D. Hull, H.M. Rosenberg: Phys.Rev.Let., 1959, 2, 5; Ref. 10: D. Hull, H.M. Rosenberg - Phil.Mag., 1959, 4, 303; Ref. 12: D. Gugan, J.S. Dugdall, J. Can: Phys. Rev., 1958, 36, 1248.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR
(Physicotechnical Institute of the AS UkrSSR)

SUBMITTED: May 3, 1961

Card 4/4

S/181/62/004/002/027/051
B101/B102

AUTHORS: Gindin, I. A., Kozinets, V. V., and Starodubov, Ya. D.

TITLE: Comparison of structural changes in nickel caused by deformation at 4.2 and 300°K and by subsequent creeping

PERIODICAL: Fizika tverdogo tela, v. 4, no. 2, 1962, 465-469

TEXT: Experiments with high-purity nickel (99.994%) tempered at 800°C and $3 \cdot 10^{-6}$ mm Hg and subsequently deformed by 3.5% at 4.2 or 300°K by stretching are reported. Some of the specimens were subsequently kept at room temperature for 80 - 100 hrs and subjected to creep tests at 700°C and constant pressure (2.8 kg/mm^2), while others were heated from 4.2°K to 700°C within 1.5 - 2 min and likewise subjected to creep tests. Both stretching and creeping were carried out with machines described in FMM, 7, 794, 1959. A sharply focused X-ray tube, designed by B. Ya. Pines (Ostrofokusnyye rentgenovskiye trubki i prikladnoy rentgenostrukturnyy analiz (Sharply Focused X-ray Tubes and Applied X-ray Analysis) GITTL,

Card 1/3

Comparison of structural changes in ...

1955) was used to examine the X-ray structure of the specimens. The disorientation was calculated according to P. B. Hirsch (see below). Results: The original specimens possessed large subgrains (80μ), the lattice was not distorted, and the disorientation was less than 1°. Disorientation reached 8° at 4.2°K, but was less at 300°K. Specimens deformed at 4.2°K underwent relaxation when heated to room temperature. The distortion of the lattice decreased as a result of polygonization of the subgrain fragments. Microdistortions diminished further on heating to creep temperature. The specimen deformed at 4.2°K and subsequently kept at room temperature had a more uniform and more disperse structure than the specimen heated directly from 4.2°K to 700°C. The removal of microdistortions of the specimens, especially of that deformed at 4.2°K, and the increase in disorientation during the creeping process, indicate that the substructure depends on the temperature at which deformation has taken place. There are 2 figures and 9 references: 8 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: P. B. Hirsch, J. N. Kellar, Acta Crystal., 5, 162, 1952.

Card 2/3

GINDIN, I.A.; KOZINETS, V.V.; STARODUBOV, Ya.D.

Comparison of structural changes in nickel cuased by deformation at 4.2°and 300°K and subsequent creep. Fiz.tver.tela 4 no.2:465-469 F '62. (MIRA 15:2)

1. Fiziko-tekhnicheskiy institut AN USSR, Khar'kov.
(Deformations (Mechanics)) (Creep of nickel)
(Metals, Effect of temperature on)

GARBER, R.I.; GINDIN, I.A.; MALIK, N.I.; STARODUBOV, Ya.D.

Machine for testing materials for tension and compression at the temperatures from 1,4 to 1500 K. Zav.lab. 28no.7:865-868 '62.
(MIRA 15:6)

1. Fiziko-tekhnicheskiy institut AN USSR.
(Testing machines)

37382
S/020/62/143/006/011/024
B164/B101

18.8200

AUTHORS: Gindin, I. A., Starodubov, Ya. D., and Azhazha, V. M.

TITLE: Increase of the creep resistance of nickel by prior deformation at 4.2°K

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 143, no. 6, 1962, 1325-1327

TEXT: The effect of small deformations of nickel at 4.2°K on its creep resistance at higher temperatures was examined by tempering small specimens of high-purity nickel (99.994%) in vacuo at 800°C and then drawing them at 4.2°K, the rate of drawing being 0.03 mm/sec and the degree of deformation 1.7 or 3.5%, afterward establishing the creep curves under a constant stress of 2.8 kg/mm^2 in vacuo at 700°C. For comparison, tempered specimens which had been deformed at room temperature were used as standards. An increase in creep endurance from 40 to 106 hrs (after 3.5% deformation) and a 4.5-fold increase in creep strength were obtained. Specimens prestrained at 300°C gave much lower values amounting to 51.5 hrs and to a 1.37-fold increase, respectively.

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S/020/62/143/006/011/024
B164/B101

Increase of the creep resistance, ...

Microphotographs of the specimens show that those deformed at 4.2°K present greater homogeneity of fine structure than the others. There are 2 figures and 1 table.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk USSR (Physicotechnical Institute of the Academy of Sciences UkrSSR)

PRESENTED: January 26, 1962, by G. V. Kurdyumov, Academician

SUBMITTED: September 22, 1961

Card 2/2

GINDIN, I.A.; KOZINETS, V.V.; STARODUBOV, Ya.D.; KHOTKEVICH, V.I.

Structural changes in copper depending on low-temperature deformation and subsequent annealing. Fiz.met.i metalloved. 14 no.6:864-873 D '62. (MIRA 16:2)

1. Fiziko-tekhnicheskiy institut AN UkrSSR i Khar'kovskiy gosudarstvennyy universitet.
(Copper--Metallography)
(Metal, Effect of temperature on)

ACCESSION NR: AT4013981 S/3070/63/000/000/0116/0118

AUTHOR: Gindin, I. A.; Starodubov, Ya. D.

TITLE: Device for metallographic and radiographic investigations of the structure of solid bodies during deformation at low temperatures

SOURCE: Novy*ye mashiny*i pribory*dlya ispy*taniya metallov. Sbornik statey. Moscow, Metallurgizdat, 1963, 116-118

TOPIC TAGS: low temperature metallography, low temperature radiography, micro-photography, deformation, metal deformation

ABSTRACT: Devices described in the literature are intended either for determination of mechanical properties of solid bodies at low temperatures, or for low-temperature metallography. However, these devices do not permit direct observation of changes in structure of a specimen during the process of its stressing at low temperatures. Metallographic and usually radiographic investigations of structure of deformed specimens are performed after the specimens have regained room temperature, despite irreversible changes in them. A device has been developed by the authors permitting observation, photographing and taking of motion pictures of changes on the surface of a specimen during cooling, deformation at

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ACCESSION NR: AT4013981

low temperature, and subsequent heating. The device is also suitable for radiographic investigations of structure in solid bodies during cooling, low-temperature deformation, and heating. The design of the device permits cooling a specimen down to approximately 10K, measuring this temperature, deforming a specimen in tension or compression, and simultaneously recording values for the "load-deformation" diagram. A schematic illustration of the device is given in Fig. 1 of the Enclosure. The test specimen 1, in the form of flat plate enlarged at its ends, is gripped by jaws 2 located in a depression of the mounting table. One of the jaws is fixed to the table; the other is connected to rod 3 of the loading mechanism and is guided by grooves in the table. The cooling of the specimen to the required temperature is provided through a copper conductor 4 (25 mm in diameter), the lower part of which is immersed in a liquid coolant contained in the vacuum-bottle 5. In order to increase the cooling rate and to reduce the temperature difference between test specimen and coolant, circulation of the coolant is provided through an axial bore in the conductor 4 and tubes 6 and 7. For regulation of the specimen temperature and of the cooling rate, a resistance 8 is provided and a heater 9 in the lower part of the mounting table. The specimen temperature is measured by a thermocouple or a pick-up resistor. The wire connections of the temperature pick-up pass through vacuum insulators 10. The mounting table with the

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ACCESSION NR: AT4013981

measures the deflection of spring 21, i.e., the load applied to the specimen. A yoke with three ribs 25 provides greater bending stiffness to conductor 4. The specimen is subjected to a constant-speed axial deformation of 0.03 mm/sec, and a maximum load of 200 kg can be applied. For X-ray investigations at low temperatures, a small chamber for photographing by reflection has been devised (see Fig. 2 of the Enclosure), which can be flanged to the test chamber and sealed by a rubber gasket. A beryllium window 2, 12 mm in diameter and 0.3 mm thick, is used to introduce the X-ray beam into the test chamber. Inside the chamber, a magazine with film 3 is mounted and a sector screen 4 of lead underneath the magazine. The screen permits taking four X-ray pictures without disturbing the vacuum in the chamber, and consequently without heating the specimen. The screen has to be rotated 90° after each exposure. The height of the film magazine location over the sample is adjustable. For making of radiograms, a sharp-focussed X-ray tube designed by B. Ya. Pines is used. A photographic camera can be installed to take microphotographs and radiograms of the same spot of the sample. The residual pressure in the vacuum chamber is 10^{-5} to 10^{-6} mm Hg. The temperature of the specimen depends on the coolant used and is 78K with liquid nitrogen, 25K with liquid hydrogen, and 10K with liquid helium. Orig. art. has: 2 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR (Institute of Physics and Technology AN USSR)

Card 4/7

ACCESSION NR: AT4013981

SUBMITTED: 00 DATE ACQ: 20Feb64 ENCL: 02

SUB CODE: MM NO REF SOV: 010 OTHER: 000

Card 5/7

ACCESSION NR: AT4013981

ENCLOSURE: 01

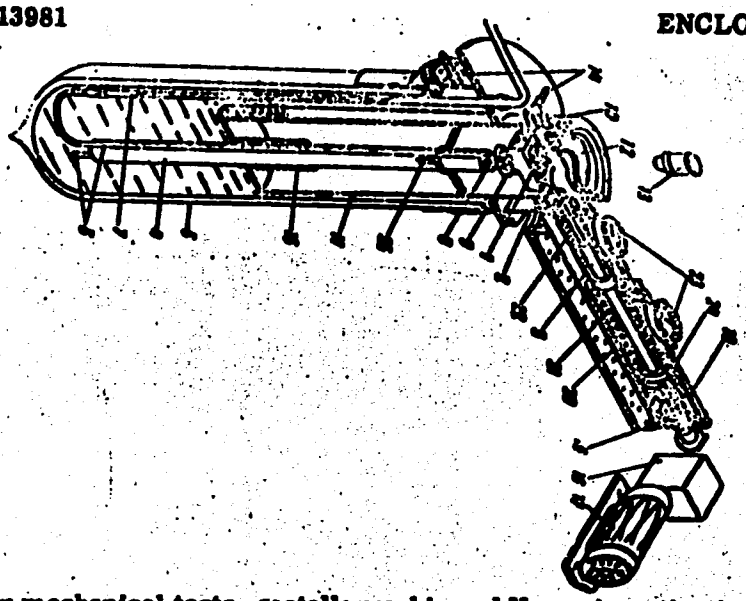

Fig. 1. Device for mechanical tests, metallographic and X-ray investigations at low temperatures

Card 6/7

ACCESSION NR: AP4037066 S/0129/64/000/005/0044/0046

AUTHOR: Gindin, I. A.; Lazareva, M. B.; Nikishov, A. S.; Rink, L. P.; Starodubov, Ya. D.; Yarov, I. A.

TITLE: Mechanical properties of structural alloys at low temperature

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 5, 1964, 44-46

TOPIC TAGS: alloy, structural alloy, austenitic iron alloy, Kh25N16G7AR alloy, Kh12N20T3R alloy, Kh16G9AN4 alloy, KhN35VTYu alloy, titanium alloy, OT4 alloy, copper alloy, BrKh08 alloy, ZhS6KP alloy, steel, martensitic steel, VNS2 steel, EI659 steel, cryogenic alloy

ABSTRACT: Mechanical properties and fracture tests of Kh25N16G7AR, Kh12N20T3R, Kh17G9AN4, KhN35VTYu; austenitic iron base alloys VNS2 (EP225) and EI659, martensitic steels, ZhS6KP high-strength alloy, OT4 titanium alloy, BGKh08 copper alloy, and other [unidentified] alloys were investigated at temperatures in the 4.2—300K range.

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ACCESSION NR: AP4037066

Specimens (either flat with a cross section of 1.5 x 2 mm or round and 2.2 mm in diameter) were tested in a heat-treated condition [shown in the article]. With a decreasing test temperature the resistance to plastic deformation and the tensile strength of all alloys increased. This was found to be particularly pronounced in the case of VNS2 alloy which at 293, 77, and 20K had a tensile strength of 97.5, 155.0, and 180.0 kg/mm^2 (annealed at 950C, air cooled, and tempered at 620C for 1 hr). All alloys were found to maintain some ductility at temperatures as low as that of liquid hydrogen except for E1659 steel and OT4 alloy which failed with respective elongations of 0%(at 20K) and 0.7% (at 77K). The elongation of the VNS2 alloy, on the contrary, was found to increase with a decrease of temperature from 15% at 293K to 20% at 20K. BGKh08 copper-base alloy was also very ductile at low temperatures (at 4.2K an elongation of 18.6%). A simultaneous increase of the ductility and strength of VNS2 alloy might be explained by some changes of phase composition under the effect of low-temperature deformation. All the materials tested at temperatures down to 20K yielded uniformly, some with, some without necking. Only in the case of the VNS2 steel did the strain-stress curve at 20K have a saw-like

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ACCESSION NR: AP4037066

shape. However, at temperatures above 20K the steel yielded uniformly. The fracture mode was ductile with clearly expressed necking even at 20K. Orig. art. has: 1 figure and 1 table.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR (Physico-technical Institute, AN USSR)

SUBMITTED: 00 DATE ACQ: 05Jun64 ENCL: 00

SUB CODE: MM NO REF SOV: 002 OTHER: 000

Card 3/3

L 13385-63 EPF(n)-2/EWP(q)/BDS/EWP(r)/EWT(l)/EWT(m) AFFTC/ASD/
SSD Pu-4 JD
ACCESSION NR: AP3002746 S/0120/63/000/003/0169/0171

AUTHOR: Gindin, I. A.; Kravchenko, S. F.; Starodubov, Ya. D.; Godzhayev, V. M.

TITLE: Outfit for studying metal creep at low temperatures 67 66

SOURCE: Pribory* i tekhnika eksperimenta, no. 3, 1963, 169-171

TOPIC TAGS: metal creep, low-temperature creep

ABSTRACT: A new design of the outfit for studying metal creep within 300-4.2K at a 100-kg maximum load is described. The outfit comprises: (1) a mechanism for program loading the specimen, (2) a high-sensitivity mechano-optical primary detector of small deformations, (3) an optical device with a camera for recording the elongation-time chart, (4) a liquid-level controller for the Dewar vessel, and (5) clamps for fastening the specimen. A functional diagram illustrates operation of the outfit. The following characteristics are given: rate of loading is 2.5 kg/min; deformation-time scale factor is 0.5 micron in 1 mm of the elongation axis or 30, 60, 120 min in 1 mm of the time axis; average daily variation of the light spot about the horizontal time axis is 0.5 micron; lever sensitivity is 0.1 micron/g; specimen diameter is 1, 2, or 3 mm; specimen length is 130 mm; error in deformation

Association: Physico-Technical Inst. AN UkrSSR

Card 1/2

AZHAZHA, V.M.; GINDIN, I.A.; STARODUBOV, Ya.D.

Comparing the effect of prestressing at 4.2 and 300° K on the creep characteristics of nickel at 700°C. Fiz.met. i metallored. 15 no.1:119-124 Ja '63. (MIRA 16:2)

1. Fiziko-tekhnicheskiy institut AN UkrSSR.
(Nickel—Cold working) (Creep of nickel)

L 10109-63 EPF(c)/EPF(n)-2/EWP(q)/EWT(m)/BDS AFFTC/ASD/SSD Pr-4/
Pu-4 WW/JD/IJP(C)
ACCESSION NR: AP3001699 S/0126/63/015/005/0729/0735 14

AUTHOR: Azhazha, V. M.; Gindin, I. A.; Starodubov, Ya. D.; Shapoval, B. I. 71

TITLE: Effect of low-temperature prestrain on the creep and internal friction of copper 18 18

SOURCE: Fizika metallov i metallovedeniye, v. 15, no. 5, 1963, 729-735

TOPIC TAGS: commercial-grade copper, subzero-temperature prestraining, annealing, creep characteristics, internal friction, microstructure changes

ABSTRACT: The effect of low-temperature prestrain on the creep, microstructure, and internal friction of commercial-grade copper was studied. Test specimens annealed in a high vacuum for 2 hr at 850C were prestretched 2.5, 5.0, 7.5, 12.5, or 35% at a constant rate of 0.03 mm/sec at temperatures of 300 or 4.2K. Specimens prestretched at 4.2K were annealed at room temperature for 100 hr. Both groups of specimens were then subjected to short-time creep tests in a vacuum of 0.02 mm Hg at 500C under a stress of 2 kg/mm sup 2. The tests showed that a prestrain of up to 7.5% at room temperature or subzero temperature sharply decreased the rates of the first and second creep stages. The second-stage creep rate, for instance, decreased from 0.95%/hr for annealed specimens, to 0.09 and 0.05%/hr for specimens

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L 10109-63
ACCESSION NR: AP3001699

prestrained 7.5% at 300 and 4.2K. The rupture strength of approximately 6.5 hr for annealed specimens increased to approximately 10.0 and 12.3 hr for the specimens prestretched 7.5% at 300 and 4.2K. The purer the metal and the coarser the grain, the higher the effect of prestraining. Oxygen-free copper prestretched 7.5% at 300 or 4.2K and tested under the above conditions had a creep rate of 0.02 or 0.01%/hr and a rupture life of 19.5 or 24 hr. The 10% elongation and reduction of area of the annealed specimen decreased to 4% for the specimens prestrained 7.5% at 4.2 and 300K. Prestrain at 4.2K strengthens grain boundaries and adjacent grain zones and promotes formation of a substructure. This sharply reduces the number of microcracks formed along grain boundaries during creep and inhibits intergranular failure of the metal. Low-temperature prestrain reduces internal friction in copper and significantly increases the temperature at which it begins to rise sharply, e.g., from approximately 100C for annealed specimens to 320 and 470C for specimens prestrained at 300 and 4.2K. Orig. art. has: 1 table and 8 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR (Physicotechnical Institute, AN USSR)

SUBMITTED: 11Nov62 DATE ACQ: 11Jul63 ENCL: 00

SUB CODE: 00 NO REF SOV: 016 OTHER: 003

Card 2/2

L 10751-63 EPR/EWT(1)/EWP(q)/EWT(m)/BDS--AFFTC/ASD--Ps-4--WW/JD

ACCESSION NR: AP3001700 S/0126/63/015/005/0736/0747

AUTHOR: Gindin, I. A.; Starodubov, Ya. D.

TITLE: Concerning the ductility of polycrystalline niobium at helium temperatures

SOURCE: Fizika metallov i metallovedeniye, v. 15, no. 5, 1963, 736-747

TOPIC TAGS: mechanical properties of Nb, helium temperatures, microstructure, microhardness, deformation mechanism, multiple necking, nonductility transition temperature

ABSTRACT: The mechanical properties of Nb in the temperature range from 1.4 to 300K have been investigated. Nb wire (0.1% Ta, 0.058% Ti, 0.05% Fe, 0.03% Si) 3 mm in diameter was drawn to diameters of 1.94, 1.17, or 1.03 mm with process annealing. The specimens were then vacuum annealed at 1800—2400C to remove impurities, especially gases (see Table 1 of Enclosure). The average grain size in all annealed specimens was the same, approximately 75—100 μ. Tensile tests at 1.4—300K at a strain rate of 0.03 mm/sec showed that pure Nb retains substantial ductility even at temperatures close to absolute zero (see Table 2 of Enclosure). Between 200 and 140K the elongation drops; at temperatures below 20K reduction of area rises sharply. At temperatures below 20K the strain-stress curves have a sawlike shape, which is caused by multiple necking. Up to 9 necks ings formed on the specimens tested at 4.2K. The microhardness along the gage

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L 10751-63

ACCESSION NR: AP3001700

length varied from a maximum of 92.5 kg/mm^2 in the necklings to a minimum of 54—60 kg/mm^2 between the necklings. Microscopic examination showed that plastic deformation in the whole range from 1.4 to 300K occurs by a slip. Some slip lines were straight and some wavy. Twin crystals were observed only with deformation temperatures and only in some specimens below 77K. "The authors are grateful to B. G. Lazarev for continued interest in the work and for valuable advice." Orig. art. has: 9 figures, 2 tables, and 2 formulas.

ASSOCIATION: none

SUBMITTED: 15Aug62 DATE ACQ: 11Jul63 ENCL: 02

SUB CODE: ML NO REF SOV: 006 OTHER: 017

Card 2/4 2

GINDIN, I.A.; LAZAREVA, M.B.; NIKISHOV, A.S.; RINK, L.P.; STARODUBOV, Ya.D.; YAROV, I.A.

Mechanical properties of structural steels at low temperature. Metalloved. i term. obr. met. no.5:44-46 My '64. (MIRA 17:6)

1. Fiziko-tekhnicheskiy institut AN UkrSSR.

L 43856-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b)/EWA(c) Pad IJP(c)
MJW/JD/JW/HW
ACCESSION NR: AP4048767 S/0126/64/018/004/0511/0517

34
33
B

AUTHOR: Azhazha, V. M.; Gindin, I. A.; Starodubov, Ya. D.

TITLE: Effect of stress and temperature on creep in nickel preliminarily deformed at 4.2 K.

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 4, 1964, 511-517

TOPIC TAGS: creep, nickel, stress, temperature effect, nickel deformation, low temperature deformation

ABSTRACT: The effect of stress and temperature was investigated on creep in nickel which underwent a deformation at 4.2 K. It was found that this low temperature deformation increases the life of N-O-nickel during creep. In the investigated temperature range (4.2 to 300 K), the lifetime of nickel is an exponential function of the stress and of the inverse temperature. The tensile strength is also increasing. The activation energy of creep in nickel corresponds to the activation energy of self-diffusion. The increased resistance to creep is connected with the formation of fine-grained, disoriented substructure which resists

Card 1/2

L 43856-65
ACCESSION NR: AP4048767

intergranular slipping. Orig. art. has: 4 figures, 2 tables.

ASSOCIATION: Khar'kovskiy fiziko-tekhnicheskiy institut AN UkrSSR (Khar'kov Physical Technical Institute, AN UkrSSR)

SUBMITTED: 01Aug63 ENCL: 00 SUB CODE: MM

NR REF SOV: 017 OTHER: 002

Card 2/2

L 43653-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(b) IJP(c) JD
ACCESSION NR: AP4048776 S/0126/64/018/004/0605/0611

17
15
13

AUTHOR: Gindin, I. A.; Starodubov, Ya. D.

TITLE: Direct observation of the generation and growth of mechanical twinning at low temperature tension of pure iron

SOURCE: Fiziko metallov i metallovedeniye, v. 18, no. 4, 1964, 605-611

TOPIC TAGS: mechanical twinning, low temperature iron tension, pure iron twinning

ABSTRACT: The generation and growth of a twin layer in pure (99.99%) iron was studied under tension at 78 K. It is shown that as the twin thickens upon application of a continuous load, the coefficient of mechanical strengthening of the boundary decreases. Annealing at 300 K restores the original high strengthening coefficient. The data obtained show that the boundary and the region near the boundary change in a different manner on the twin-layer appearance, at its growth and after annealing. The pattern of microdestruction indicates that there is no direct connection between the crack formation and the twinning of pure iron.

Card 1/2

L 43053-65
ACCESSION NR: AP4048776

2

The authors are grateful to A. A. Yayes for his help in the investigation. Orig. art. has: 6 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR (Physicotechnical Institute AN UkrSSR)

SUBMITTED: 03Aug63 ENCL: 00 SUB CODE: MM

NR REF SOV: 010 OTHER: 000

Card 2/2

L 22898-65 EWT(m)/EWP(b)/T/EWA(d)/EWP(w)/EWP(t) IJP(c) JD
ACCESSION NR: AP5001246 S/0126/64/018/005/0762/0769

AUTHOR: Gindin, I.A.; Starodubov, Ya. D.

TITLE: Extending the life of pretwinned pure iron and the development of twins in the course of high-temperature creep

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 5, 1964, 762-769

TOPIC TAGS: iron life, pretwinned iron, high temperature creep, iron creep, iron twinning, iron microstructure

ABSTRACT: The authors studied the influence of small preliminary deformations at low temperatures (300, 77, and 4.2K) on the high-temperature (600C) creep of pure iron (99.99%). The microstructure of the deformed samples and its change in the course of creep was studied by the metallographic and microinterferential method at room temperature. It was found that the small preliminary deformation at low temperatures causes an appreciable increase in the creep strength and life of iron; this hardening effect is explained by the interaction of twinning and glissile dislocations. A new type of shear plasticity was observed during the high-temperature creep of the iron. Creep after a small low-temperature deformation is characterized by an increase in the plasticity

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L 22898-65
ACCESSION NR: AP5001246

3

reserve, caused by a more uniform distribution of the slip bands over the length of the specimen and by the development of twinning interlayers. The results obtained confirm the view that there is no direct relationship between brittle fracture and twinning. "In conclusion, the authors thank P.V. Ivanitskiy and A.A. Yayes for assistance in carrying out the experiments." Orig. art. has: 8 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR (Physicotechnical Institute, AN Ukr SSR)

SUBMITTED: 19Aug63 ENCL: 00 SUB CODE: MM

NO REF SOV: 014 OTHER: 000

Card 2/2

GINDIN, I.A.; STARODUBOV, Ya.D.

Increase of the durability of pre-twinned pure iron and the development of twinning during high temperature creep. Fiz.met. i metalloved. 18 no.5:762-769 N '64.

(MIRA 18:4)

1. Fiziko-tekhnicheskiy institut AN UkrSSR.

L 39679-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b) Pad IJP(c)
ACCESSION NR: AP5008790 MJW/JD/HW S/0126/65/019/003/0439/0442

29
27
B

AUTHOR: Azhazha, V. M.; Gindin, I. A.; Kozinets, V. V.; Starodubov, Ya. D.

TITLE: Effect of annealing temperature on the substructure and strength of nickel deformed at 4.2K

SOURCE: Fizika metallov i metallovedeniye, v. 19, no. 3, 1965, 439-442

TOPIC TAGS: nickel, preliminary nickel deformation, nickel process annealing, nickel property, nickel creep resistance, nickel substructure

ABSTRACT: The effect of annealing temperature on the substructure and mechanical properties of N-O-type nickel stretched 3.5% at 4.2K has been studied. Annealing was done at 300, 500, 700, 900, or 1000K. Annealing at 300 to 700K slightly reduced the subgrain size, while annealing at 900 or 1000K increased it. The optimal annealing temperature was 500K at which a fine polygonized substructure with a large disorientation angle between the subgrain

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L 39679-65
ACCESSION NR: AP5008790

2

fragments and subgrains was formed. Nickel with such a substructure has the highest resistance to plastic deformation at room temperature, the longest rupture life, and the highest creep resistance. Specimens annealed at 500K showed almost no first creep stage and the creep rate in the second stage was six times lower than that of the initial metal and five times lower than that of nickel annealed at 1000K. The subgrain size was found to be practically the same with any annealing temperature, and to be considerably smaller than that of the initial metal. Orig. art. has: 3 figures. [ND]

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR (Physico-technical Institute, AN UkrSSR); Khar'kovskiy gosuniversitet (Khar'kov State University)

SUBMITTED: 07Jan64 ENCL: 00 SUB CODE: MM

NO REF SOV: 007 OTHER: 002 ATD PRESS: 3230

BJS
Card 2/2

L 08716-67 EWT(m)/EWP(w)/EWP(t)/ETI/EWP(k) IJP(c) JD/HW
ACC NR: AP6033052 SOURCE CODE: UR/0126/66/022/002/0254/0261

AUTHOR: Gindin, I. A.; Starodubov, Ya. D.; Zakharov, V. I. 43 B.

ORG: Physicotechnical Institute, AN UkrSSR (Fiziko-tekhnicheskiy institut AN UkrSSR)

TITLE: Investigation of the effect of low-temperature deformation on the creep resistance of nickel and copper at high temperatures

SOURCE: Fizika i metallov i metallovedeniye, v. 22, no. 2, 1966, 254-261

TOPIC TAGS: nickel, creep, ~~resistance~~, copper, ~~creep resistance, nickel, mechanothermal treatment, copper, mechanothermal treatment~~ mechanical heat treatment, rupture strength

ABSTRACT: Specimens of oxygen-free copper (99.98%-pure) and vacuum-melted nickel (99.95%-pure), vacuum-annealed at 1050C (nickel) and 900C (copper) for 4 hr, were subjected to low temperature mechanothermal treatment (LMTT) stretched by 3.7% (nickel) or 8% (copper) at 4.2 and 300K, and "annealed" at room temperature for about 100 hr. The specimens were then tested for creep resistance at temperatures ranging from 500C to 1000C. It was found that LMTT improved considerably the rupture life of both metals. For instance (see Fig. 1), the rupture life of untreated nickel specimens at 800C under a stress of 1.3 kg/mm^2

Card 1/2 UDC: 548.0:539

L 08716-67
ACC NR: AP6033052

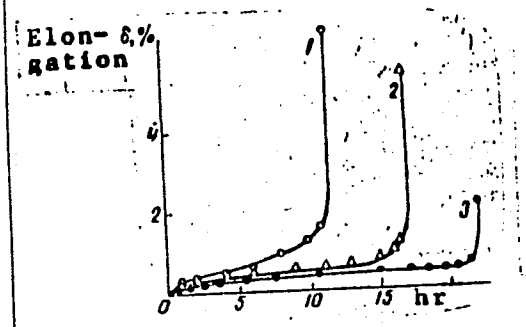

Fig. 1. Primary creep curves of nickel at 800C under a stress of 1.3 kg/mm^2

1 - Untreated specimen; 2 and 3 - specimens stretched at 300 and 4.2K, respectively.

was 11.3 hr, the elongation was 6.5%; the rupture life of specimens deformed at 300 and 4.2K was 17 and 22 hr, and the elongation was 5.8 and 2.0%, respectively. The creep resistance of copper specimens was similarly affected by LMTT. The effect of LMTT on creep behavior is preserved at temperatures up to 1000C for nickel and up to 700—750C for copper. Orig. art. has: 3 figures and 3 tables.

SUB CODE: 13, 11/ SUBM DATE: 10Aug65/ ORIG REF: 011/ OTH REF: 001

Card 2/2 net

ACC NR: AP6022042 (A) SOURCE CODE: UR/0120/66/000/003/0225/0226

AUTHOR: Gindin, I. A.; Starodubov, Ya. D.; Kravchenko, S. F.; Lazareva, M. B.

ORG: Physico-Technical Institute, AN UkrSSR, Khar'kov (Fiziko-tekhnicheskiy institut AN UkrSSR)

TITLE: A device for rolling metals at temperatures of 4.2-300°K

SOURCE: Pribory i tekhnika eksperimenta, no. 3, 1966, 225-226

TOPIC TAGS: low temperature physics, low temperature metal, low temperature research, metal rolling

ABSTRACT: The device is used to measure the electrical resistance of deformed samples and for carrying out heat treatment in the temperature range from 4.2 to 1000°K. The basic characteristics of the setup are as follows: roller diameter--30 mm; operating length of the rollers--20 mm; rolling speed--1 and 10 mm/min; initial cross section of samples--from 3 to 5 mm^2 (depending on the material). The thickness of the foil obtained is on the order of ten microns. For example, for copper at 20°K, the thickness is 20-30 microns. Orig. art. has: 1 figure.

SUB CODE: 11,20,13/ SUBM DATE: 24Apr65/ ORIG REF: 002/ OTH REF: 002

UDC: 621.59:621.771

Card 1/1

ACC NR: AP7001543 SOURCE CODE: UR/0020/66/171/003/0552/0554

AUTHOR: Gindin, I. A.; Starodubov, Ya. D.; Lazareva, M. B.; Lazarev, B. G. (Academician AN UkrSSR)

ORG: Physicotechnical Institute Academy of Sciences UkrSSR (Fiziko-tekhnicheskiy institut Akademii Nauk UkrSSR)

TITLE: Low-temperature recrystallization of copper rolled at 77 and 20K

SOURCE: AN SSSR. Doklady, v. 171, no. 3, 1966, 552-554

TOPIC TAGS: copper, low temperature deformation, ~~copper~~ metal deformation, ~~copper~~ metal recrystallization, recrystallization temperature, recrystallization activation energy, metal rolling, grain size, metal physical property

ABSTRACT: Specimens of 99.98%-pure copper with an initial grain size of 100 μ were rolled at 293, 77, and 20K with a 10% reduction per pass and a total reduction of 90%. The specimens were rolled at a speed of 10 mm/min and immediately annealed at 293—468K. X-ray diffraction pattern examination showed that low-temperature deformation decreased the grain size, produced noticeable microdistortion in the lattice, and significantly reduced the temperature of the beginning of recrystallization. Copper deformed with a 90% reduction recrystallized even at room temperature. The lower the deformation temperature, the sooner the recrystallization begins. For instance, in copper rolled at 20K the recrystallization begins after 19 hr, while in copper rolled at 77K-after 2.5 month. With decreasing deformation tempera-

Card 1/2 UDC: 539.2

ACC NR: AP7004567 SOURCE CODE: UR/0126/66/021/004/0600/0607

AUTHOR: Gindin, I. A.; Godzhayev, V. M.; Lazarova, M. B.; Starodubov, Ya. D.

ORG: Physicotechnical Institute, AN UkrSSR (Fiziko-tekhnicheskiy institut AN UkrSSR)

TITLE: Low-temperature creep of lithium in the region of polymorphous transformation

SOURCE: Fizika metallov i metallovedeniye, v. 21, no. 4, 1966, 600-607

TOPIC TAGS: creep, metal deformation

ABSTRACT: A study was made of creep in Li at 300, 180 and 77 K., encompassing the polymorphous transformation range. The electrical resistance of specimens during the creep process was measured. It is shown that for long-term low-temperature creep of Li, the creep curves show three stages, instantaneous deformation, a transitional stage and a stage of steady flow. At 77 K. the logarithmic rule of the transitional stage of creep is valid up to those values of stress at which polymorphous transition is absent or weakly defined. Creep curves of single-phase specimens at 300 K. even in the case of low stresses, do not comply with the logarithmic rule. A maximum of electrical resistance during creep at 77 K. was found which decreases in a steady pattern in specimens previously strained at 77 K. Orig. art. has: 8 figures. [JPRS: 36,774]

SUB CODE: 20 / SUBM DATE: 09Mar65 / ORIG REF: 005 / OTH REF: 009

Card 1/1 UDC: 539.292:539.376

0926 1465

ACC NR: AP7005206

rapidly under stepwise creep conditions. The results are interpreted from the point of view that the ultrasound lowers the potential barrier for the motion of the dislocations in the crystal and facilitates their motion. It is also possible that point defects are produced under the influence of the ultrasound. Orig. art. has: 5 figures.

SUB CODE: 20, 11/ SUBM DATE: 31Jan66/ ORIG REF: 004/ OTH REF: 008

Card 2/2

STARODUBOVA, A. T. -- "The Phagocytic Defense of the Organism in Cases of Post-Vaccinal Anti-Diphtheria Immunity under Experimental Conditions." Kazakh State Medical Institute imeni V. M. Molotov. Alma-Ata, 1955. (Dissertation for the Degree of Candidate in Medical Sciences.)

So; Knizhaya Letopis' No 3, 1956

STARODUBOVA, A.T.

Change in the phagocytic reaction in passive antidiphtherial immunity under experimental conditions. Zhur.mikrobiol. epid. i immun. 32 no.4:33 Ap '61. (MIRA 14:6)

1. Iz Kazakhskogo meditsinskogo instituta.
(PHAGOCYTOSIS) (DIPHTHERIA) (IMMUNITY)

GORYAINOVA, Z.P., kand.med.nauk, STARODUBOVA, T.F., kand.med.nauk.
LAKIZA, P.I., assistent

Role of various environmental factors in the spread of helminthiasis in children's institutions. Gig. i san. 23 no.5:72-75 My '58 (MIRA 11:6)

1. Iz kafedry epidemiologii, kafedry obshchey gigiyeny, kafedry kommunal'noy gigiyeny Dnepropetrovskogo meditsinskogo instituta.
(HELMINTH INFECTIONS, transm.
environmental factors in children's institutions (Rus))

ACCESSION NR: AR4015653 S/0081/63/000/021/0094/0094

SOURCE: RZh. Khimiya, Abs. 21G47

AUTHOR: Kovalenko, N. P.; Shchemeleva, G. G.; Bagdasarov, K. N.; Starodubskaya, A. A.

TITLE: Electrolytic separation of lead and uranyl, and the subsequent photocolorimetric determination of uranyl

CITED SOURCE: Sb. Elektrokhim. i optich. metody* analiza. Rostov-na-Donu, Rostovsk. un-t, 1963, 153-159

TOPIC TAGS: lead, uranyl, electrolytic lead separation, electrolytic uranyl separation, photometric analysis, photometric uranyl determination

ABSTRACT: It was established that UO_2^{2+} can be separated quantitatively from 2500 times the amount of Pb^{2+} by electrodeposition of Pb from a hydrochloric acid solution, containing NH_2OH, on a copperplated Pt cathode (75-80C, 2 amps, 2 v). The determination of UO_2^{2+} is completed photometrically, using an arsenazo dye. It was shown that UO_2^{2+} forms a colored compound (1:1) with the latter with a peak light absorption at 584 mμ (molecular absorption coefficient $1.9 \cdot 10^4$). The color intensity of the compound is maximal at pH 4.4-7.0. The color develops

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ACCESSION NR: AR4015653

instantly and does not vary over the course of an hour. The color intensity drops as the temperature increases, Beer's law being observed at UO_2^{2+} concentrations of 0.2-2.4 γ/ml. Zn, SO_4^{2-}, NO_3^- and Cl^- do not interfere with the photometric determination described, using arsenazo, while Fe^{3+}, Cu^{2+}, Sb^{3+}, Pb^{2+}, Bi^{3+}, citrate, tartrate and NH_2OH do interfere. To determine Pb and UO_2^{2+} when both are present, 120 ml of the solution to be analyzed (containing 5 ml of concentrated HCl and 2 g of $NH_2OH \cdot HCL$) is heated to 75-80C and subjected to electrolysis while stirring. The current intensity is increased gradually from 1.4 to 2 amps and the voltage from 1.4 to 2 v. The electrolysis lasts 50 minutes. After separation is complete, the cathode with the precipitate of Pb is rinsed first in running water, then in alcohol and ethyl ether, and finally dried and suspended. The electrolyte is evaporated to a concentration of about 60 ml, 18 ml of 4 N KOH are added, and the solution is cooled and diluted to 100 ml. Ten ml of the resulting solution are again treated with 3 ml of a 25% solution of urotropin and 2.5 ml of a 0.02% solution of arsenazo, then heated for 3-5 minutes over a boiling water bath, cooled, diluted with water to a volume of 50 ml and measured photometrically with an orange filter in 3 cm cuvettes. The error in determining 10-100 γ UO_2^{2+} and 100-250 mg Pb in 50 ml of solution was 2%. The analysis takes 2.5-3 hours. N. Chudinova

DATE ACQ: 09Dec63 SUB CODE: CH ENCL: 00

Card 2/2

STARODUBROVSKAYA, R.A.

DEM'YANOV, V.N.; POPOVA, T.N.; KORINA, A.S., kandidat geographicheskikh nauk, dotsent [deceased]; STARODUBROVSKAIA, R.A.; DOBROVOL'SKIY, V.V., dotsent, redaktor.

[General physical geography] Obshchaia fizicheskaia geografiia. Moskva, Izd-vo geodezicheskoi lit-ry. Pt I. 1953, 394 p. (MIRA 7:5)
(Physical geography)

BERZON, I.S.; PARIYSKAYA, G.N.; STARODUBROVSKAYA, S.P.

Recording high-frequency reflected waves in the Russian Platform. Izv. AN SSSR.Ser.geofiz.no.6:644-656 Je '56. (MLRA 9:9)

1.Akademiya nauk SSSR, Geofizicheskiy institut.
(Russian Platform--Seismometry)

STARODUBROVSKAYA, S.P.

Selecting average velocity in plotting boundaries of separation in lateral hodographs of refraction waves. Trudy Geofiz.no.35:248-257 '56. (MLRA 10:1)

(Seismic waves)

49-5-1/18

AUTHOR: Starodubrovskaya, S. P.

TITLE: An experiment in mapping buried fault zones by dynamic characteristics of refracted waves. (Opyt trassirovaniya pogrebennykh narushennykh zon po dinamicheskim kharakteristikam prelomlennykh voln).

PERIODICAL: "Izvestiya Akademii Nauk, Seriya Geofizicheskaya", (Bulletin of the Ac.Sc., Geophysics Series, 1957, No.5, pp.553-568 (U.S.S.R.)

ABSTRACT: Account of work carried out in 1951-1952 by the Geophysical Institute of the U.S.S.R. Ac.Sc. (Geofizicheskii Institut AN SSSR), now renamed Institute for the Physics of the Earth, Ac.Sc. U.S.S.R. (Institut Fiziki Zemli AN SSSR), with a view to developing a method for mapping buried fault areas. The field work was done in different regions of the Soviet Union, not named in the paper, where under sandy clay deposits steeply inclined metamorphic rock layers occurred. A high-frequency "Seismic Station" BЧ-22, described by Gamburtsev and Berson (1), developed and constructed at the Geophysical Institute of the U.S.S.R. Ac.Sc. was used. The work was done with filterings respectively peaked to 90 and 100 c.p.s. using "Ilay" 30 c.p.s. seismographs, without using a mixer or an

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An experiment in mapping buried fault zones by dynamic characteristics of refracted waves. (Cont.)

less intense seismograms than those from intact rocks; 2) the record presents a different pattern; 3) the apparent velocities are different. Seismograms produced by faults cannot be correlated over many profiles and sometimes cannot be correlated at all, especially in media consisting of thin layers. Mapping of fault areas is done on the basis of these features and examples of the technique are given. In media with thin layers, in cases where a correlation of profiles is possible, the contours of layers forming part of the fault zone are mapped, when, however, no detailed correlation is possible, only the outlines of the corresponding fault zone are traced. On the basis of these seismic maps the following features of faults can be inferred: 1) Tectonic faults do not take the form of lines, or rather vertical contact (planes), but of areas having a length and width; in the cases investigated their dimension across varied from 20 to 250 m; 2) The outlines of fault areas are formed by wavy lines; 3) Within these contours, the medium has a complicated structure; it consists of a number of lens-shaped layers, usually extending in the same direction as the fault area. The number of "lenses" is

An experiment in mapping buried fault zones by dynamic characteristics in refracted waves. (Cont.)

greatest where the fault area is widest. This picture agrees well with that given by Gzovskiy (8 and 9) on the basis of geological considerations.
There are 10 figures, 1 table and 9 references, all of which are Slavic.

SUBMITTED: May 16, 1956.

ASSOCIATION: Ac.Sc. U.S.S.R. Institute of the Physics of the Earth. (Akademiya Nauk SSSR Institut Fiziki Zemli).

AVAILABLE: Library of Congress
Card 4/4

STARODUBROVSKAYA, S.P.

PHASE I BOOK EXPLOITATION SOV/3560

Akademiya nauk SSSR. Institut fiziki zemli

Seysmicheskaya razvedka (Seismic Prospecting) Moscow, Izd-vo AN SSSR, 1959. 374 p. (Series: Its: Trudy, No. 6 /173/) Errata slip inserted. 1,500 copies printed.

Ed.: I.S. Berzon, Doctor of Physical and Mathematical Sciences; Ed. of Publishing House: L.I. Ratnikova; Tech. Ed.: V.V. Volkova.

PURPOSE: The publication is intended for geologists and geophysicists, particularly for those interested in the study of seismic waves and their use in geological prospecting.

COVERAGE: This is a collection of 17 articles published by the Academy of Sciences USSR as transactions of the Institute of Physics of the Earth. The first four articles present mainly an analysis of amplitudinal properties of waves. The second group of four articles deals with problems of frequency analysis of seismic waves. The remaining articles cover a wide field of problems in seismology such as methods of interpretation of dynamic properties of waves, observation of reflected latitudinal waves, design of high-frequency seismic instruments, etc. References are given at the end of each article.

AVAILABLE: Library of Congress

SOV/49-59-1-5/23

AUTHORS: Berzon, I.S., Vasil'yev, Yu. I., Starodubrovskaya, S.P.

TITLE: On Refracted Waves in Water-Saturated Sand. I. (O prelomlennykh volnakh, sootvetstvuyushchikh vodonosnym peskam. I.)

PERIODICAL: Izvestiya Akademii Nauk, SSSR, Seriya Geofizicheskaya, 1959, Nr 1, pp 32-48 + 4 plates (USSR)

ABSTRACT: The kinematic and dynamic characteristics of the refracted waves in water-saturated sand were investigated in the Institute of Earth Physics, Ac.Sc., U.S.S.R. The correlation method was applied in a region where, under 5 to 50 m of clay, loam, was a layer of water-saturated fine sand (P_g^3 Pt) of 7 to 30 m thick. Below, there was a layer of clay (20 to 60 m thick) placed on a crystal metamorphic base. The apparatus employed were: high frequency receiver VCh-22 (Ref 26) and a medium one of "Ilay." type. The method of absorption was based on the separate longitudinal and transverse profiles. The wave t_Π corresponding to that of sand was registered at

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On Refracted Waves in Water-Saturated Sand. I.

the distances of every 30 to 60 m along 800 m from the detonation point. For the first 350 m $t_п$ was registered as the first wave (Fig.1a,b). At greater distances ($\Delta > 350$ m) it was registered as a secondary wave (Fig.1,vand Fig.2). Generally, the wave $t_п$ was always distinguished as a separate group of oscillations with two to three periods (Fig.2). Its frequency varied from 120 to 200 h (Fig.3), while the frequencies of the waves in the clay layer ($t_г$) and the crystal base ($t_к$) were 70 and 50-70 h respectively. The general character of the wave $t_п$ is shown in Figs 4 and 5. The hodographs (Fig.6) show transverse profiles parallel to each other and almost straight. The boundary velocity $V_г$ and the apparent velocity V^* were determined for the longitudinal and transverse profiles. Their values varied from 1500 to 1800 m/sec. The results of this determination are shown in Fig.7 where the following notations are used: 1 and 2 - values of $V_г$ and V^* respectively, as determined from the longitudinal hodographs; 3 - $V'_г$ from transverse hodographs; 4 - isolines of error $|\delta V/V|$. The

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On Refracted Waves in Water-Saturated Sand. I.

distribution of V_Γ is shown in Fig.8. The various values of V_Γ, together with the damping coefficient α of the wave t_Π, were plotted along the actual profiles (Fig.9). Figs. 10-13 show graphs of the amplitude obtained for both the longitudinal and transverse profiles, together with the appropriate values of damping coefficient α_2 or α_2^*. It can be seen that the latter value varies from 0.002-0.004 to 0.040 m^{-1} for one type of wave t_Π. The decrement of damping ϑ_2 was calculated from Eq.(1), where λ_2 - mean wavelength. The value of ϑ_2 was found to vary from 0.03 to 0.6. The variation in the damping coefficient was due to several causes. It was possible to establish a relationship between this coefficient and the frequency (Fig.14) as Eq.(3). In Fig.15 the relation is shown between the coefficient α_2 and the velocity V_Γ for one of the profiles. This relationship is also evident in Fig.9. The analysis shows

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that the coefficient of damping can also be defined as Eq.(2), where $\alpha_{2\ ИСТ}$ - true damping coefficient, k - coefficient relative to the energy lost in the neighbouring strata. In general, the relationship (4) can be defined, where V_1 and V_3 - velocities in the top and the bottom neighbouring strata. It is evident then that α_2 is not related to the frequency alone. Neither the values of h, V_1/V_Γ nor V_3/V_Γ affect it. Therefore, it appears that the main factor affecting the total value of α_2 is the coefficient $\alpha_{2\ ИСТ}$ which depends entirely on the condition of a refracting medium. This can be seen in Figs. 10 and 11 where the line a-a represents the cross section of the profile.
There are 15 figures and 32 references, 11 of which are Soviet, 21 English.

SOV/49-59-1-5/23

On Refracted Waves in Water-Saturated Sand. I.

ASSOCIATION: Akademiya nauk SSSR, Institut fiziki Zemli
(Ac. Sc., USSR, Institute of Earth Physics)

SUBMITTED: May 14, 1957

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SOV/49-59-2-1/25

AUTHORS: Berzon, I. S., Vasil'yev, Yu. I., Starodubrovskaya, S. P.

TITLE: On Refracted Waves in Water Saturated Sand. II (O prelomlennykh volnakh, sootvetstvuyushchikh vodonosnym peskam. II)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya geofizicheskaya, 1959, Nr 2, pp 177-182 (USSR)

ABSTRACT: There are two methods of determining the wave velocity: when sand lies on the surface and no pressure is considered, or when the sand layer is at a depth Z and the pressure of its weight is encountered. In both cases a 3-component velocity should be considered, i.e. composed of velocities in sand, pore water and pore air. In the case where no account of pressure is taken the 3-component velocity $V_{s0}^{(3)}$ can be calculated from Eq (1) where m_s and ρ_s are the mean compression and mean density respectively, calculated from Eqs (2) and (3), where f_i - volume part of every component ($f_1 + f_2 + f_3 = 100\%$). The value of m_s can be expressed in the values of ρ_i and V_i according to the formula (4). Therefore, the resultant velocity can be given as Eq (5), where $a = f_2 + f_3$ - volume of pores filled with liquid and gas (i.e.

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total porosity of the medium). Fig 1 illustrates the relationship of $V_{s0}^{(3)}$ and the volume f_2 (water pores) in the case when $a = 20$ to 30% . The curves were determined for the following data: $V_1 = 5000$ m/sec, $V_2 = 1500$ m/sec, $V_3 = 330$ m/sec; $\rho_1 = 2.78/cm^3$, $\rho_2 = 1.0$ g/cm^3 , $\rho_3 = 129 \times 10^{-3}$ g/cm^3 . It can be seen from the graphs that when f_3 is negligible ($f_3 = a - f_2 = 0.1$ to 0.2%) , the velocity in the sand remains the same as in the case when all pores are filled with air. The velocity in the sand and the depth z can be calculated from Eq (6) (Refs 3 and 4), where E and σ - Young modulus and the Poisson coefficient for solids respectively, $\rho_1 \rho_0$ - density of solid and liquid respectively, $f_1 f_2$ - their volumes. According to Ref 2, the formula for 2-component velocity $V_{s0}^{(2)}$ in the case when $z = 0$ is calculated from Eq (7). In order to adjust this

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equation to the 3-component medium, the value of ρ_0 should be substituted by ρ_2 and ρ_3. In the result, Eq (8) is obtained, which is substituted into Eq (6) in order to obtain the resultant velocity $V_{sz}^{(3)}$ (Eq 9). Fig.2 shows the relation of $V_{sz}^{(3)}$ (Curve 1 - at z = 50 m) and $V_{s0}^{(3)}$ (Curve 2) to the volume of pores filled with water (total porosity a = 47.6%). It is seen that the velocity does not change much with the variations of f_2. The relation of the velocity in the 2-component medium to the porosity can be seen in Fig.3, where the ratios $V_{s0}^{(2)}/V_2$ (V_2 - velocity in water) and α/α_{max} (α - coefficient of absorption) are plotted against the porosity f_2. As it is seen, when the porosity $f_2 < 30\%$, the velocity in the 2-component medium can differ from that in water by as much as 20%. Therefore, it is impossible to determine the porosity of the 2-component medium from the variations of velocity. The coefficient of absorption in the 2-component medium can be calculated from the formula (10)

On Refracted Waves in Water Saturated Sand

(Refs 8 and 9), where η - viscosity of liquid, r - radius of sand grain, F - frequency in h . The relationship of the coefficient α and porosity f_2 can be calculated from the expression (11). It can be seen from Fig 3 that the coefficient of absorption is more sensitive to the variations of porosity in comparison to that of velocity. Also, it is affected by the properties of sand (e.g. when the radius of the sand grain in Eq (11) increases by 2, the coefficient increases by 4). The variations in determining the velocity in sand by various methods (Refs 2-5, 8, 9) were due mainly to the different approach in calculation of the porosity and mechanical properties of sand. The seismic method proposed

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in this work will assist in better determination of the extent of the sand layer under the Earth's surface, a fact which is of interest to soil mechanics engineers. There are 3 figures and 9 references; 3 of the references are Soviet and 6 are English.

ASSOCIATION: Akademiya nauk SSSR, Institut fiziki Zemli (Academy of Sciences USSR, Institute of Physics of the Earth)

SUBMITTED: May 14, 1957.

STARODUBROVSKAYA, S.P.

Approximate method of calculating theoretical seismograms for waves generated in finely stratified media. Trudy Inst. fiz.zem. no.6:81-106 '59. (MIRA 13:5)
(Seismometry)

GAMBURTSEV, Grigoriy Aleksandrovich, akademik [deceased]; RIZNICHENKO, Yu.V., red.; MOLODENSKIY, M.S., red.; BERZON, I.S., doktor fiz.-mat.nauk, red.; KEYLIS-BOROK, V.I., doktor fiz.-mat.nauk, red.; LYAPUNOV, A.A., doktor fiz.-mat.nauk, red.; YEPINAT'YEVA, A.M., kand.tekh.nauk, red.; KOSMINSKAYA, I.P., kand.fiz.-mat.nauk, red.; STARODUBROVSKAYA, S.P., mladshiy nauchnyy sotrudnik, red.; BERKGAUT, V.G., red.izd-va; MARKOVICH, S.G., tekhn.red.

[Selected studies] Izbrannye trudy. Moskva, Izd-vo Akad.nauk SSSR, 1960. 461 p. (MIRA 13:7)

1. Chleny-korrespondenty AN SSSR (for Riznichenko, Molodenskiy).
(Prospecting--Geophysical methods)

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AUTHOR: Starodubrovskaya, S.P.

TITLE: Experimental Study of the Peculiarities of Longitudinal Waves Reflected From a Thin Layer

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya, No.10 pp.1466-1473 ~1960

TEXT: Two regions near the Carpathians which had been seismically well-studied were used. These were characterized by a thin, horizontal layer at a known distance below the surface. The layer has a higher wave velocity (~4500 to 5000 m/sec) and consists of Tertiary rock. In region I, the thickness of the layer is 15 m and its depth is 900 m. Correspondingly, the figures for region II are 15 m and 1350 m. The overlying strata have an average wave velocity of 2500 to 2600 m/sec and the underlying strata - 3600 m/sec. The apparatus used in the measurements is described in Ref.9 and 10. The observations were made in the frequency range 25 to 100 cps. It was found that the higher-frequency

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Experimental Study of the Peculiarities of Longitudinal Waves Reflected From a Thin Layer

components were more important and the width of the frequency spectrum larger for the layers at the smaller depth. As the distance of reception from the source of explosion increased, the higher frequency waves weakened more quickly. The shapes of the recorded waves do not, however, change with distance from the source - they appeared to be quasi-sinusoidal. The author compares the theoretical calculations which were made in Ref.8 with the experimental results for layer II (which has approximately the same parameters). There is good agreement with the predicted amplitude of the oscillations, but a slight difference in the predicted shape. There are 5 figures, 1 table and 12 Soviet references.

ASSOCIATION: Akademiya nauk SSSR Institut fiziki Zemli (Academy of Sciences USSR Institute of Physics of the Earth)

SUBMITTED: December 13, 1959

BERZON, I.S., doktor fiz.-matem. nauk; YEPINAT'YEVA, A.M.; PARIYSKAYA, G.N.; STARODUBROVSKAYA, S.P.; FREMD, V.M., red. izd-va; GOLUB', S.P., tekhn. red.

[Dynamic characteristics of seismic waves in real media]Dinamicheskie kharakteristiki seismicheskikh voln v real'nykh sredakh. [By] I.S.Berzon i dr. Moskva, Izd-vo Akad. nauk SSSR, 1962. 511 p. (MIRA 16:2)

(Seismic waves)

L 25026-65 EWT(1)/EWA(h) Peb GW

ACCESSION NR: AP5001949 S/0049/65/000/012/1737/1752

AUTHOR: Starodubrovskaya, S. P.

TITLE: The physical prerequisites for the utilization of the dynamic characteristics of reflected longitudinal waves in tracing layers of variable thickness

SOURCE: AN SSSR. Izvestiya. Seriya geofizicheskaya, no. 12, 1964, 1737-1752

TOPIC TAGS: longitudinal wave, reflected wave, gas deposit, outcrop zone, wave dynamics, wave recording, incident wave, incident pulse, interface, oil deposit, geophysical prospecting

ABSTRACT: This study deals with the theoretical investigation of the dynamic characteristics of longitudinal waves reflected from homogeneous thin layers of variable thickness. A better knowledge of such waves would be very helpful in the exploration of the outcrop zones to which oil and gas deposits are confined. Theoretical seismograms and wave spectra were used in the study of the dynamic characteristics of reflected waves. The variable thickness layer used for calculation purposes was represented by a series of layers with plane-parallel boundaries and discretely changing thicknesses. The boundaries of a layer were considered plane-parallel over a definite distance if the outcrop angle φ equalled 2-3°, but such distances could be considerably longer with $\varphi \sim 1°$. The spectra

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ACCESSION NR: AP5001949

of the waves reflected from a thin layer were determined on the basis of the theoretical seismograms by means of a BESM-2 electronic computer and the methods of B. M. Naymark. . The spectral characteristics of the waves reflected from a thin layer were then compared with those of the waves reflected from thick layers, and characterized by similar velocity and density, with a view to establishing special criteria for distinguishing between those types of waves. Orig. art. has: 5 figures and 2 tables.

ASSOCIATION: Institut fiziki Zemli, Akademiya Nauk SSSR (Terrestrial physics institute, Academy of sciences, SSSR)

SUBMITTED: 22Oct63 ENCL: 00 SUB CODE: ES

NO REF SOV: 010 OTHER: 000

Card 2/2

STARODUBROVSKAYA, S.P.; PARIYSKAYA, G.N. [deceased]

Utilization of the dynamic characteristics of reflected waves for detecting and tracing layers of variable thickness. Razved. geofiz no.283-12 '64. (MIRA 18:5)

STARODUBROVSKAYA, S.P.

Physical requirements of using the dynamic characteristics of longitudinal reflected waves in prospecting strata of variable thickness. Izv. AN SSSR. Ser. geofiz. no.12:1737-1752 D '64. (MIRA 18:3)

1. Institut fiziki Zemli AN SSSR.

L 37133-66

ACC NR: AP6027842 SOURCE CODE: UR/0094/66/000/005/0022/0024

AUTHOR: Starodubov, V. A. (Engineer)

ORG: none

TITLE: Testing of a contactless synchronous motor on a conveyer drive

SOURCE: Promyshlennaya energetika, no. 5, 1966, 22-24

TOPIC TAGS: conveying equipment, electric motor, mining machinery

ABSTRACT: The unique problems of conveyer drive motors for usage in mines (extremely varied load with rare operation at peak load, requirement for explosion safety, etc.) have hindered the usage of synchronous motors for such applications in the past. This is a report on a contactless synchronous motor of 6.5 kw used for some time in Karagandinskaya oblast. The motor was tested installed on a mine conveyer. In about 500 starts on the conveyer, the motor operated perfectly every time, although the start is the time of greatest stress on the motor. The motor can be started while connected to the reduction gear for driving the conveyer. Orig. art. has: 4 figures. [JPRS: 36,501]

SUB CODE: 09, 13 / SUBM DATE: none / ORIG REF: 002

Card 1/1 UDC: 621.313.333:662.647

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[illegible], .

[illegible] Stroitel'stvo trudovykh kooperativnykh sel'skokhozyaystv v Bolgarii. Sots. Sel. Khoz-vo, 1949, No. [illegible], s. 44-52

SO: IZVESTIYA NO. 35 1949

STAR DUBROVSKAYA, V N

Stroitel'stvo Ekonomicheskogo Fundamenta Sotsializma V Narodnoy Respublike Bolgarii
[Building Socialism's Economic Foundations in the People's Republic of Bulgaria]
Moskva, Izd-vo Akademii Nauk SSSR, 1953.
222 p.
At Head of Title: Akademiya Nauk SSSR. Institut Ekonomiki.

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STARODUBROVSKAYA, V.

The origin and development of cooperative (group) property in the agriculture of the European people's democracies.
Vop.ekon. no.9:86-100 S '56 (MLRA 9:10)

(Europe, Eastern--Agriculture, Cooperative)

YAN TSZYAN'-BEY [Yang Chien-pei]; STARODUBROVSKAYA, V.N.; KONOVALOV, Ye.A.; GUAN' DA-TUN [Kuan Ta-t'ung]; OLEYNIK, I.P.; SEMENOVA, L.S.; KHE LI [He Li]; CHZHAN SY-TSYAN' [Chang Ssŭ-ch'ien]; VOINOV, A.M.; SHIRYAYEV, S.L.; KURAKIN, V.A.; STUPOV, A.D., red.; KANEVSKAYA, T.M., red.; GERASIMOVA, Ye.S., tekhn.red.

[Economy of the Chinese People's Republic, 1949-1959] Ekonomika Kitaiskoi Narodnoi Respubliki, 1949-1959. Moskva, Gosplanizdat, 1959. 304 p. (MIRA 13:5)

1. Zaveduyushchiy sektorom ekonomiki stran narodnoy demokratii Instituta ekonomiki AN SSSR (for Stupov).
(China--Economic conditions)

STARODUBROVSKAYA, Vera Nikolayevna; YEVSTIGNEYEV, R.N., mladshiy nauchnyy sotrudnik; KALMYK, V.A., red.; GERASIMOVA, Ye.S., tekhn.red.

[Economic union of the working class and the peasantry in the European people's democracies] Ekonomicheskii soiuz rabochego klassa i krest'ianstva v evropeiskikh stranakh narodnoi demokratii. Moskva, Gosplanizdat, 1959. 250 p. (MIRA 12:6)

1. Sektor stran narodnoy demokratii Instituta ekonomiki AN SSSR (for Yevstigneyev).
(Europe, Eastern--Economic conditions)

STARODUBROVSKAYA, V.

Undivided funds of agricultural cooperatives in the European people's democracies. Vop.ekon. no.7:70-80 Jl '60. (MIRA 13:5)

(Europe, Eastern--Agriculture, Cooperative--Finance)

USIYEVICH, M.A., kand. ekon. nauk; VIDMAR, V.N., kand. ekon. nauk; STUPOV, A.D., kand. sel'khoz. nauk; STARODUBROVSKAYA, V.N., kand. ekon. nauk; STOROZHEV, V.I., kand.ist. nauk; RUDAKOV, Ye.V., kand. ekon. nauk; KIRANOV, P., prof.; KHORVAT, L. [Horvat, L.], kand. ekon. nauk; KROMM, K., doktor; FRUKK, Kh. [Frukk, H.], doktor; SHMIDT, V.[Schmidt, V.], prof., doktor; TEPIKHT, Ye.[Tepicht, E.], prof.; NIK, S. [Nic,S.], kand. ekon. nauk; DUMITRIY, D.[Dumitro, D.]; SVOBODA, K., kand. ekon. nauk; LEPNIKOVA, Ye., red.; KIRSANOVA, I., mladshiy red.; NOGINA, L., tekhn. red.

[Socialist reorganizations in the agriculture of the European people's democracies] Sotsialisticheskie preobrazovaniia v sel'skom khoziaistve evropeiskikh stran narodnoi demokratii. Moskva, Sotsekgiz, 1963. 334 p. (MIRA 16:7)

1. Akademiya nauk SSSR. Institut ekonomiki mirovoy sotsialisticheskoy sistemy.2. Institut ekonomiki mirovoy sotsialisticheskoy sistemy AN SSSR (for Usiyevich, Vidmar, Stupov, Starodubrovskaya, Storozhev, Rudakov).
(Europe, Eastern--Agriculture, Cooperative)

STARODUBSKAYA, V.A.

Methods for reducing the incidence of diphtheria in Tashauz Province. Zdrav.Turk. 3 no.2:35-36 Mr-Ap '59. (MIRA 12:8)

1. Glavnyy vrach Tashauzskoy oblastnoy sanepidstantsii.
(TASHAUZ PROVINCE--DIPHTHERIA)

STARODUBSKAYA, V.A.

Study of the state of immunity against diphteria in Tashauz Province. Zdrav.Turk. 6 no.6:40-42 N-D '62. (MIRA 16:3)

1. Iz Tashauzskoy oblastnoy sanitarno-epidemiologicheskoy stantsii (glavnyy vrach V.A. Starodubskaya).
(TASHAUZ PROVINCE—DIPHTERIA—PREVENTIVE INOCULATION)

MEDVEDEV, I.A.; GLIKMAN, E.S.; BEL'GOL'SKIY, B.P.; VOLKOVA, Ye.N.; STARODUBSKIY, D.F.; LIKHACHEV, Ye.N.

Methods of determining the effect of the volume of output on the magnitude of general plant expenditures and metallurgical plant production costs. Izv. vys. ucheb. zav.; chern. met. 6 no.6: 209-213 '63. (MIRA 16:8)

1. Dnepropetrovskiy metallurgicheskiy institut.
(Iron industry) (Steel industry)

VANAG, Ya.[Vanags, J.]; DZERVE, P.; KAUGUR, K.[Kaugurs, K.]; LATSIS,R. [Lacis, R.]; ROKPELNIS, F.; RUNTSIS, A.[Runcis, A.]; STARODUBSKIY,L.; PLOTKE, I., red.; SILIN',V.[Silins,V.], tekhn. red.

[Fifteen years of Soviet Latvia, 1940-1955]15 let Sovetskoi Latvii, 1940-1955. Sost. i avtory tekstov: IA.Vanag i dr. Red. I.Platke. Riga, Latviiskoe gos. izd-vo, 1955. 1 v. (MIRA 15:12)
(Latvia--Views)

1. STARODUBSKIY, L. V.

2. USSR (600)

4. Latvia - Industries

7. Real level of industrial production in bourgeois Latvia. Latv PSR Zin Akad Vestis. No. 11 1951.

9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

1. STARODUBSKIY, L.

2. USSR (600)

4. Economic Conditions - Riga

7. Growth of the economic structure of Soviet Riga. Latv. PSR Zin. Akad. Vestis no. 12: 1951

9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

STARODUBSKIY, L V

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Upadok Fabrichnozavodskoy Promyshlennosti v Burzhauznoy Latvii (Decline of Factory and Plant Industry in Bourgeois Latvia) Riga, Akademkniga Latviiskoy SSR, 1952.

221 p. Tables.

At Head of Title: Akademiya Nauk Latviyskoy SSR. Institut Ekonomiki.

STARODUBSKIY, L.

Monograph on the reproduction of the labor force in the U.S.S.R. ("Reproduction of the labor force in the U.S.S.R. and the balance of labor" by M.IA.Sonin. Reviewed by L.Starodubskii). Sots.trud 4 no.7:148-151 Jl '60. (MIRA 13:8)
(Labor and laboring classes)
(Sonin, M.IA.)

PRUDENSKIY, G.A., red.; STARODUBSKIY, L.V., otv. red.; ZYKOV, S.S., red.; PERVUSHIN, V.A., red.; SONIN, M.Ya., red.; ROMANOVA, E.A., red.; MAZUROVA, A.F., tekhn. red.; VYALYKH, A.M., tekhn. red.

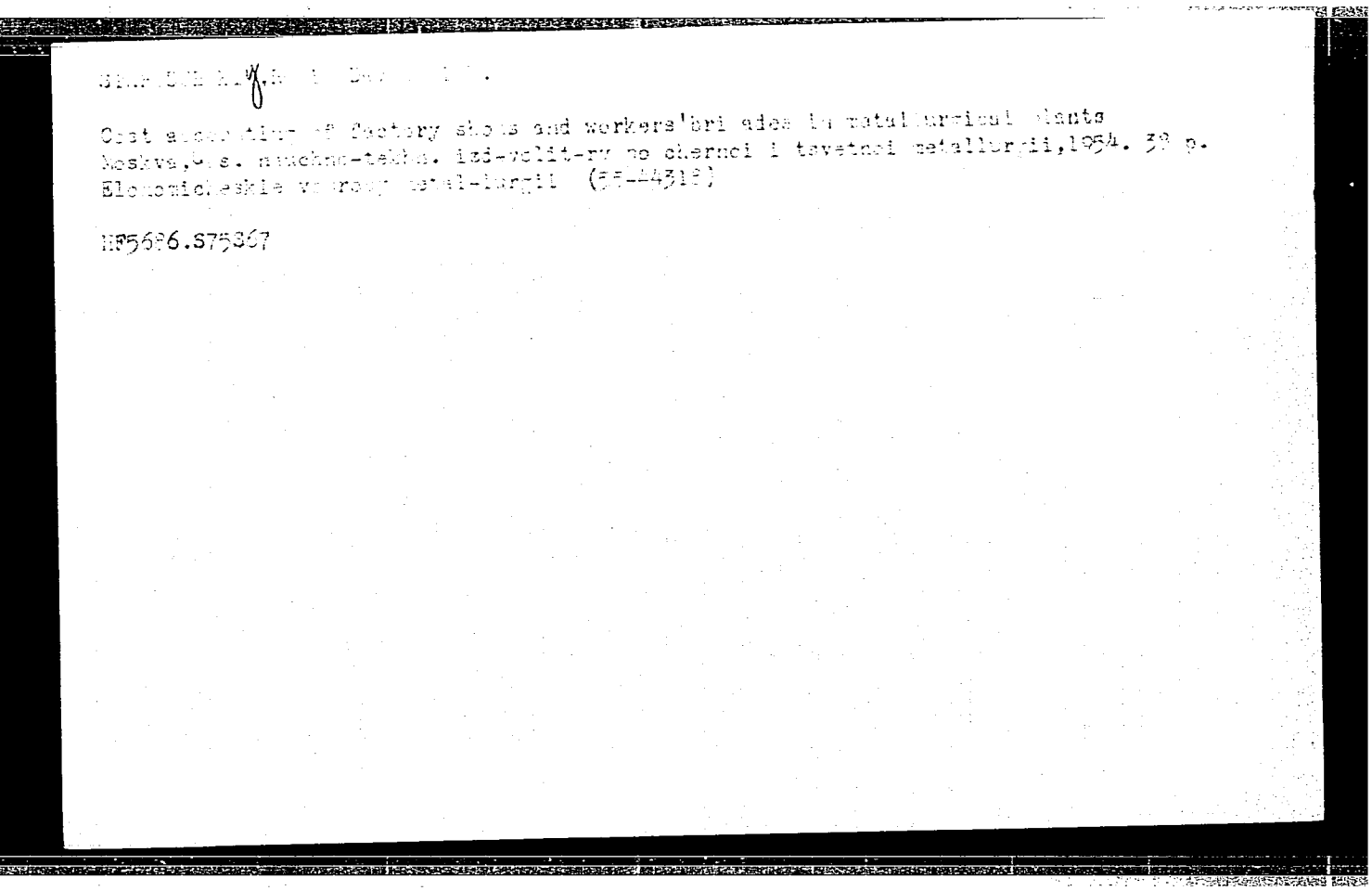
[Problems of labor resources in Siberia]Voprosy trudovykh resursov v raionakh Sibiri. Pod obshchei red. G.A.Prudenskogo. Novosibirsk, Izd-vo Sibirskogo otd-nie AN SSSR, 1961. 168 p. (MIRA 15:10)

1. Akademiya nauk SSSR. Sibirskoye otdeleniye. Institut ekonomiki i organizatsii promyshlennogo proizvodstva.
(Siberia--Labor supply--Statistics)

STAR[illegible]SKIY, L.V.

Methodological problems in studying the diversified development of regional economy. Izv. Sib. otd. AN SSSR no.10:13-24 '62 (MIRA 17:8)

1. Institut ekonomiki i organizatsii promyshlennogo proizvodstva Sibirskogo otdeleniya AN SSSR, Novosibirsk.



Cost accounting in factory shops and workers' aids in metallurgical plants
Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1954. 39 p.
Ekonomicheskie voprosy chernoi metallurgii (55-44318)

HF5686.S75367